

Survey on Tourist Apartment Occupancy (EOAP)

Methodology

Contents

1	Presentation	3
2	Objectives	3
3	Statistical Unit	3
4	Scope of the Survey	4
5	Definition of Variables	4
6	Survey Framework and Sample Design	6
7	Estimators	7
8	Information Collection	11
9	Dissemination of Information	11
10	Statistical secret	11
11	Coefficients of variation	12
12	Linkage Coefficients	12
13	Empty strata treatment	14

1 Presentation

This publication presents the methodology of the Survey on Tourist Apartment Occupancy.

The most important information from the survey is provided on a monthly basis, in accordance with INE dissemination rules.

The data provided reflects the dual facets of what is considered in the tourism study: the demand, which provides information on travellers, overnight stays and the average stay length categorised by country of residence for non-resident travellers in Spain and by autonomous community of origin for Spanish travellers; from the supply side, data is provided on the estimated number of operating companies and open establishments, estimated beds and apartments, occupancy rates, as well as employment in the sector.

This information is offered monthly on a national level, by autonomous community, provinces with the highest number of overnight stays, as well as the most significant tourist areas and resorts.

The National Statistics Institute (INE for its Spanish initials) would like to thank all the professionals, businesspeople and organisations related to the tourist industry for their collaboration, which is absolutely essential for conducting this survey.

2 Objectives

The main aim of the Survey on Tourist Apartment Occupancy is to ascertain the behaviour of a series of variables that make it possible to describe the fundamental characteristics of the hotel sector, from the viewpoint of both supply and demand, thus meeting the needs of national institutions and the requirements of international organisations for knowledge regarding the sector.

3 Statistical Unit

The study population includes all tourist apartment establishments and tourist apartment operators, as defined by the regulations of the respective autonomous communities.

A **tourist apartment establishment** is understood to be any production unit whose exclusive or main activity is the accommodation of tourists, distributed in furnished units (apartments, chalets, villas, bungalows...).

A tourist apartment (unit) is a property that is rented on a regular basis for the purpose of accommodation.

A group of units, in turn, forms a tourist apartment establishment. The establishment may consist of several buildings.

In some Autonomous Communities, the units of analysis are the companies operating tourist apartments. These are defined as natural or legal persons who, whether or not they own the accommodations, regularly engage in the activity of granting their use or enjoyment.

4 Scope of the Survey

All tourist apartment establishments and/or operating companies within the national territory are surveyed, with the exception of Ceuta and Melilla, where no such establishments exist.

5 Definition of Variables

5.1 ESTIMATED OPEN ESTABLISHMENTS/COMPANIES OF TOURIST APARTMENTS

The estimated number of seasonally open tourist apartment establishments/companies as determined by the survey.

A seasonally open tourist apartment establishment/company is defined as one for which the reference month falls within its operating period.

5.2 ESTIMATED APARTMENTS IN A TOURIST APARTMENT ESTABLISHMENT OR OPERATING COMPANY

Estimated number of apartments belonging to seasonal tourist apartment establishments or operating companies that are open.

5.3 ESTIMATED PLACES IN A TOURIST APARTMENT ESTABLISHMENT OR OPERATING COMPANY

The estimated number of bed-places, as calculated by the survey, in seasonally open tourist apartment establishments or operating companies.

The number of bed-places corresponds to the number of fixed beds; therefore, extra beds are not included, and double beds count as two bed-places.

5.4 TRAVELLERS ENTERED

All persons who stay overnight for one or more consecutive nights in the same accommodation.

Travellers are classified by their place of residence. In the case of Spanish residents, information is requested about their Autonomous City/Community of residence.

5.5 OVERNIGHT STAYS OR OCCUPIED BED-PLACES

An overnight stay is understood to be each night that a traveller stays at the establishment.

As with travellers entering, the occupied bed-places are broken down according to the place of residence.

5.6 AVERAGE STAY

This variable is an approximation of the number of days, on average, that travellers lodge in apartments, which is calculated as the ratio between overnight stays and the number of travellers.

5.7 OCCUPANCY RATE BY BED-PLACES

Ratio, as a percentage, between the total number of overnight stays and the product of the bed-places, including extra beds, by the number of days considered in the overnight stays.

By this definition, it may occur that an establishment and/or company has an occupancy rate below one hundred percent and yet have no free bed-places, as an apartment could be occupied by only one person, which results in only one overnight stay, although the apartment itself has a larger capacity.

5.8 OCCUPANCY RATE BY APARTMENTS

The percentage ratio between the total number of occupied apartments and the product of available apartments and the number of days covered by the survey.

5.9 WEEKEND OCCUPANCY RATE BY BED-PLACES

The percentage ratio between overnight stays on Fridays and Saturdays within the reference month and the product of available places, including extra beds, and the number of days covered by the overnight stays.

5.10 WEEKEND OCCUPANCY RATE BY APARTMENTS

The percentage ratio between the number of apartments occupied on Fridays and Saturdays within the reference month and the product of available apartments and the number of days corresponding to the occupied apartments.

5.11 EXTRA BEDS

Extra beds are defined as all beds that are not fixed and are not included in the officially declared bed-places of the establishment as listed in the directory.

Fixed furniture in the apartment (sofa bed, pull-down bed, etc.) is only counted as an extra bed when it is actually used as such.

Cots will also be considered extra beds.

5.12 STAFF EMPLOYED

Defined as the set of people, paid or unpaid, who contribute by means of their work, to the production of goods and services during the survey reference period, even though they may work outside the premises.

5.13 TOURIST RESORT

Municipality with a significant tourist offering concentration.

5.14 TOURIST AREA

Group of municipalities where the tourist influx is specially focused. Information is provided on the main areas of tourist interest.

In the document [List of municipalities comprising each tourist area](#), the main areas of tourist interest are attached, together with the municipalities that make up these areas.

6 Survey Framework and Sample Design

The sampling framework is formed from the directories of the Autonomous Community Tourism Departments and other secondary sources, which contain, among others, the following data for each establishment: name, address, category, normal opening period, number of bed-places and rooms. These directories are continuously updated.

The survey's sampling design is based on a stratified random sampling method, where strata are defined by the combination of province (or island), unit sample size according to the number of apartments (TAM), and size group. The stratification variable 'size group' is included in the survey design for the first time in 2025. Its aim is to achieve greater homogeneity among establishments based on the number of bed-places or capacity.

The variable TAM takes 3 values, as follows:

TAM	Establishments of
1	1-25 Apartments
2	26-99 Apartments
3	100 or more Apartments

For the sets formed by the combination of province (island) × TAM, the cumulative square root rule of the frequency distribution is applied (see Cochran, 1977). This rule divides the establishments in the set into two subsets: the first includes establishments with lower capacity, while the second includes those with higher capacity.

When the number of establishments in the directory for a given province × TAM is fewer than 10, this rule is not applied.

The establishments that are studied comprehensively and therefore belong to the sample with a probability of 1 are those with TAM = 3 and those considered relevant with high capacity within each province/island × TAM combination.

To calculate the sample size, an optimal allocation has been applied, requiring a prefixed sampling error for the stratified estimator of the total number of bed-places of 4.5% at the provincial (island) level

The minimum required sample size for each stratum—province, TAM, and size group—is 5 establishments.

The definition of the strata, as well as the [sampling fractions](#) is provided in the attached document.

The sample is selected within each stratum in a systematic manner. Each month the sample is renewed by adding new establishments. The establishments in the sample are maintained for 4 years, with approximately 25% being renewed (this only applies to the sampling strata only)

7 Estimators

This section describes the expressions for the estimators, considering the information received from XML files.

The XML files are generated directly from the management systems of the establishments, following a schema and validations published by the INE. These files provide detailed information on traveller arrivals and overnight stays for each day of the reference month, broken down by traveller residence (Nomenclature of Territorial Units for Statistics [NUTS] III for residents in Spain, and by country for non-residents).

The **variables** used are:

- E = no. of establishments and/or companies open during the month, as recorded in the directory
- e = no. of establishments and/or companies that respond to the survey using the usual questionnaire method (incidences 1 and 2)
- e" = no. of establishments and/or companies replying to the survey by sending the XML file (incidents 1 and 2)
- c = number of establishments and/or companies in the sample that are closed within their opening period (in the reference month, incidence 3)
- D = no. of days in the reference month (28, 29, 30, 31)
- D^{fs} = no. of Fridays and Saturdays in the reference month
- dm = no. of days that the establishment has been open in the reference month (only for those who send the XML file)
- d = no. of days in the reference fortnight (14, 15, 16). Only for those who respond to the survey via the usual method
- d^{fs} = no. of Fridays and Saturdays in the reference fortnight. Only for those who respond to the survey via the usual method
- P = no. of places according to directory
- P' = no. of bed-places according to the survey
- V = no. of travellers checked in
- N = no. of occupied bed-places or overnight stays
- N' = no. of overnight stays in extra beds

- EM = average stay
- T = staff employed
- A = no. of apartments according to the directory
- A' = number of apartments according to the survey
- B = no. of occupied apartments
- GP = occupancy rate by bed-places
- GA = occupancy rate per apartment

The **subindices** used are:

- i = establishment/operating company
- j = geographic region (point, area, province)
- k = size (1, 2 and 3)
- t = size group (in terms of bed-places)
- m = category (place of residence, professional status, etc.)
- a = apartment category

Estimators obtained considering fortnightly information plus XML (for all strata)

1. Estimated number of establishments open in the reference month

$$\hat{E}_{jkt} = E_{jkt} \cdot \frac{\left(e_{jkt} + \sum_{i=1}^{e''_{jkt}} \frac{dm_{ijkt}}{D} \right)}{\left(e_{jkt} + e''_{jkt} \right) + c_{jkt}}$$

2. Estimated number of bed-places in establishments and/or operating companies open during the month

$$\hat{P}_{jkt} = \sum_{i=1}^{E_{jkt}} P_{ijkt} \cdot \frac{\sum_{i=1}^{e_{jkt}} P'_{ijkt} + \sum_{i=1}^{e''_{jkt}} P'_{ijkt} \cdot \frac{dm_{ijkt}}{D}}{\left(\sum_{i=1}^{e_{jkt}} P_{ijkt} + \sum_{i=1}^{e''_{jkt}} P_{ijkt} \right) + \sum_{i=1}^{c_{jkt}} P_{ijkt}}$$

3. Estimated number of arriving travellers during the month, by place of residence m

$$\begin{aligned} \hat{V}_{jktm} &= \left[\sum_{i=1}^{e_{jkt}} V_{ijktm} \cdot \frac{D}{d_{ijkt}} + \sum_{i=1}^{e''_{jkt}} V_{ijktm} \right] \cdot \left[\frac{\hat{P}_{jkt}}{\sum_{i=1}^{e_{jkt}} P'_{ijkt} + \sum_{i=1}^{e''_{jkt}} P'_{ijkt} \cdot \frac{dm_{ijkt}}{D}} \right] \\ &= \left[\sum_{i=1}^{e_{jkt}} V_{ijktm} \cdot \frac{D}{d_{ijkt}} + \sum_{i=1}^{e''_{jkt}} V_{ijktm} \right] \cdot \rho_{jkt} \end{aligned}$$

where ρ_{jkt} is the elevation factor per bed-place in province/island j, per size k and size group t.

4. Estimated number of occupied bed-places or overnight stays, by place of residence m

$$\hat{N}_{jktm} = \left[\sum_{i=1}^{e_{jkt}} N_{ijktm} \cdot \frac{D}{d_{ijkt}} + \sum_{i=1}^{e'_{jkt}} N_{ijktm} \right] \cdot \left[\frac{\hat{P}_{jkt}}{\sum_{i=1}^{e_{jkt}} P'_{ijkt} + \sum_{i=1}^{e'_{jkt}} P'_{ijkt} \cdot \frac{dm_{ijkt}}{D}} \right]$$

$$= \left[\sum_{i=1}^{e_{jkt}} N_{ijktm} \cdot \frac{D}{d_{ijkt}} + \sum_{i=1}^{e'_{jkt}} N_{ijktm} \right] \cdot \rho_{jkt}$$

where ρ_{jkt} is the elevation factor per bed-place in province/island j, per size k and size group t.

5. Estimated number of occupied extra bed-places

$$\hat{N}'_{jkt} = \left[\sum_{i=1}^{e_{jkt}} N'_{ijkt} \cdot \frac{D}{d_{ijkt}} + \sum_{i=1}^{e'_{jkt}} N'_{ijkt} \right] \cdot \left[\frac{\hat{P}_{jkt}}{\sum_{i=1}^{e_{jkt}} P'_{ijkt} + \sum_{i=1}^{e'_{jkt}} P'_{ijkt} \cdot \frac{dm_{ijkt}}{D}} \right]$$

$$= \left[\sum_{i=1}^{e_{jkt}} N'_{ijkt} \cdot \frac{D}{d_{ijkt}} + \sum_{i=1}^{e'_{jkt}} N'_{ijkt} \right] \cdot \rho_{jkt}$$

where ρ_{jkt} is the elevation factor per bed-place in province/island j, per size k and size group t.

6. Estimated average stay

- a) Average stay by province/island and size k

$$E\hat{M}_{jk} = \frac{\sum_t \sum_m \hat{N}_{jktm}}{\sum_t \sum_m \hat{V}_{jktm}}$$

- b) Average stay by province/island and country of residence

$$E\hat{M}_{jm} = \frac{\sum_k \sum_t \hat{N}_{jktm}}{\sum_k \sum_t \hat{V}_{jktm}}$$

7. Estimated number of occupied bed-places on weekends

$$\hat{N}^{fs}_{jkt} = \sum_m \left(\sum_{i=1}^{e_{jkt}} N_{ijktm}^{fs} \cdot \frac{D^{fs}}{d_{ijkt}^{fs}} + \sum_{i=1}^{e'_{jkt}} N_{ijktm}^{fs} \right) \cdot \rho_{jkt}$$

8. Estimated number of occupied extra bed-places on weekends

$$\hat{N}'^{fs}_{jkt} = \sum_m \left(\sum_{i=1}^{e_{jkt}} N'_{ijktm}^{fs} \cdot \frac{D^{fs}}{d_{ijkt}^{fs}} + \sum_{i=1}^{e'_{jkt}} N'_{ijktm}^{fs} \right) \cdot \rho_{jkt}$$

9. Estimated staff employed

$$\hat{T}_{jktm} = \left(\sum_{i=1}^{e_{jkt}} T_{ijktm} + \sum_{i=1}^{e''_{jkt}} T_{ijktm} \right) \cdot \rho_{jkt}$$

m = employment status

10. Estimated number of existing apartments in the open establishments/companies

$$\hat{A}_{jkt} = \sum_{i=1}^{E_{jkt}} A_{ijkt} \cdot \frac{\sum_{i=1}^{e_{jkt}} A'_{ijkt} + \sum_{i=1}^{e''_{jkt}} A'_{ijkt} \cdot \frac{dm_{ijkt}}{D}}{\left(\sum_{i=1}^{e_{jkt}} A_{ijkt} + \sum_{i=1}^{e''_{jkt}} A_{ijkt} \right) + \sum_{i=1}^{c_{jkt}} A_{ijkt}}$$

11. Estimated amount of occupied apartments

$$\hat{B}_{jкта} = \left[\sum_{i=1}^{e_{jkt}} B_{ijкта} \cdot \frac{D}{d_{ijkt}} + \sum_{i=1}^{e''_{jkt}} B_{ijкта} \right] \cdot \frac{\hat{A}_{jkt}}{\sum_{i=1}^{e_{jkt}} A'_{ijkt} + \sum_{i=1}^{e''_{jkt}} A'_{ijkt} \cdot \frac{dm_{ijkt}}{D}}$$

$$\hat{B}_{jk} = \sum_t \sum_{a=1}^4 \hat{B}_{jкта} \quad \hat{B}_j = \sum_{k=1}^3 \hat{B}_{jk}$$

12. Estimated amount of occupied apartments on weekends

$$\hat{B}_{jкта}^{fs} = \left[\sum_{i=1}^{e_{jkt}} B_{ijкта}^{fs} \cdot \frac{D^{fs}}{d_{ijkt}^{fs}} + \sum_{i=1}^{e''_{jkt}} B_{ijкта}^{fs} \right] \cdot \frac{\hat{A}_{jkt}}{\sum_{i=1}^{e_{jkt}} A'_{ijkt} + \sum_{i=1}^{e''_{jkt}} A'_{ijkt} \cdot \frac{dm_{ijkt}}{D}}$$

13. Estimated occupancy rate

a) Occupancy rate by bed-places

$$\widehat{GP}_{jkt} = \frac{\hat{N}_{jkt}}{D \cdot \hat{P}_{jkt} + \hat{N}'_{jkt}} \cdot 100$$

For the total of the province/island:

$$\widehat{GP}_j = \frac{\sum_k \sum_t \widehat{GP}_{jkt} \cdot \hat{P}_{jkt}}{\sum_k \sum_t \hat{P}_{jkt}}$$

b) Occupancy rate by apartment

$$\widehat{GA}_{jkt} = \frac{\hat{B}_{jkt}}{D \cdot \hat{A}_{jkt}} \cdot 100$$

For the total of the province/island:

$$\widehat{GA}_j = \frac{\sum_k \sum_t \widehat{GA}_{jkt} \cdot \hat{A}_{jkt}}{\sum_k \sum_t \hat{A}_{jkt}}$$

c) Weekend occupancy rate by bed-places

$$\widehat{GP}_{jkt}^{fs} = \frac{\widehat{N}_{jkt}^{fs}}{D^{fs} \cdot \widehat{P}_{jkt} + \widehat{N}_{jkt}^{fs}} \cdot 100$$

For the total of the province/island:

$$\widehat{GP}_j^{fs} = \frac{\sum_k \sum_t \widehat{GP}_{jkt}^{fs} \cdot \widehat{P}_{jkt}}{\sum_k \sum_t \widehat{P}_{jkt}}$$

d) Occupancy rate by apartment on weekends

$$\widehat{GA}_{jkt}^{fs} = \frac{\widehat{B}_{jkt}^{fs}}{D^{fs} \cdot \widehat{A}_{jkt}} \cdot 100$$

For the total of the province/island:

$$\widehat{GA}_j^{fs} = \frac{\sum_k \sum_t \widehat{GA}_{jkt}^{fs} \cdot \widehat{A}_{jkt}}{\sum_k \sum_t \widehat{A}_{jkt}}$$

8 Information Collection

The consultation of basic data refers to a fortnight of the month, chosen randomly, in such a way that the complete month is covered among all establishments/companies.

The information is provided monthly by tourist apartment establishments or operating companies, via a questionnaire, to the National Statistics Institute. It is also possible to submit the information via electronic transmission by uploading an XML file or through an Internet connection using the ARCE system, by directly filling in the questionnaire on the screen.

9 Dissemination of Information

The information is presented at different levels of geographical disaggregation: national, autonomous community, provincial, zones and tourist resorts.

The areas (set of municipalities) have been considered, as well as the municipalities in which the tourist influx is specifically located.

Provisional results for a reference month are published around the 30th of the following month.

10 Statistical secret

Information can be given on all the stratum (or geographical data groupings) in which the number of establishment with incidence 1 (open with activity) is the same or above 3.

11 Coefficients of variation

The coefficients of variation or relative sampling errors are calculated and published for the estimators for total travellers checked in during the month, \hat{V}_{jkt} , and for the total bed-places (overnight stays), \hat{N}_{jkt} .

Let \hat{Y}_{jktm} be the estimator of any of these variables, for each province, j, size, k, size group according to bed-place, t, and category (residents or non-residents), m.

The estimated relative sampling error (in percentage) is calculated as follows:

$$\widehat{CV}(\hat{Y}_m) = \frac{\sqrt{\widehat{V}(\hat{Y}_m)}}{\hat{Y}_m} * 100$$

where

$$\widehat{V}(\hat{Y}_m) = \sum_h \widehat{V}(\hat{Y}_{jktm})$$

h denotes the stratum (jkt)

$\widehat{V}(\hat{Y}_{jktm})$ shall be calculated as follows:

$$\widehat{V}(\hat{Y}_{jktm}) = (1 - f_{jkt}) \cdot \frac{e_{jkt} + e''_{jkt}}{(e_{jkt} + e''_{jkt}) - 1} \cdot \frac{\hat{P}_{jkt}^2}{\left(\sum_{i=1}^{e_{jkt}} P_{ijkt} + \sum_{i=1}^{e''_{jkt}} P_{ijkt} \cdot \frac{dm_{ijkt}}{D} \right)^2} \cdot \sum_s (Y_{ijktm} - \hat{R}_{jktm} P_{ijkt})^2$$

where

$$f_{jkt} = \frac{e_{jkt} + e''_{jkt} + c_{jkt}}{E_{jkt}} \quad \text{and} \quad s = e + e''$$

therefore:

$$Y_{ijktm} = Y_{ijktm} \quad \text{if } i \in e''$$

$$Y_{ijktm} = Y_{ijktm} \cdot \frac{D}{d} \quad \text{if } i \in e$$

$$\hat{R}_{jktm} = \frac{\sum_{i=1}^{e_{jkt}} Y_{ijktm} \cdot \frac{D}{d} + \sum_{i=1}^{e''_{jkt}} Y_{ijktm}}{\sum_{i=1}^{e_{jkt}} P_{ijkt} + \sum_{i=1}^{e''_{jkt}} P_{ijkt}}$$

12 Linkage Coefficients

Methodological changes or extraordinary updates to the directories forming the survey framework may result in newly published data that are not directly comparable with previously published figures.

To prevent breaks in the time series and ensure comparability, linkage coefficients are calculated and applied to previously published data before the introduction of these changes.

Linkage Coefficients

Due to the strong seasonality of these series, different linkage coefficients are calculated for each month, ensuring that year-on-year variation rates remain consistent, even if month-to-month variations are not preserved.

For each month, the linkage coefficient of a variable X is obtained as the ratio between the estimated value of the variable in the given month of year T, considering all available information (including methodological changes and/or directory updates) and the estimated value of the same variable in the same month but without considering the new updates.

$$CX_{i,T} = \frac{X_{i,T}^{conmejoras}}{X_{i,T}^{sin mejoras}}$$

where:

- $i = 1 \dots 12$ months
- $X_{i,T}^{conmejoras}$ = Estimated value of the variable X in month i of year T using all available information.
- $X_{i,T}^{sin mejoras}$ = Estimated value of the variable X in month i of year T without taking into account the updates.

Linked series

The linked and comparable series with the published data are calculated by multiplying the previously published series (before the introduction of improvements) by the linkage coefficient for the corresponding month.

$$X_{i,T-j}^{enlazada} = X_{i,T-j}^{pub} \times CX_{i,T}$$

where:

- $i = 1 \dots 12$ months
- $X_{i,T-j}^{pub}$ = Estimated published value of the variable X in month i of the year $T - j$ (where $j > 0$)
- $CX_{i,T}$ = Linkage coefficient for the variable X in month i

Since the linkage coefficients have been calculated independently for each geographical breakdown, category, or nationality, the linked series lose their additivity.

13 Empty strata treatment

A stratum (province/island-size-size group) is considered empty when there are no questionnaires available for the sample selected in the stratum. When this occurs, the procedure is as described below:

1. If in such a stratum there are only establishments that are closed and negatives, i.e., $c_{jkt} \neq 0$, the estimate of any variable in that stratum will be ZERO (negatives are assumed to be closed)
2. If there are only negatives, i.e. $c_{jkt} = 0$, the following coefficients will be calculated for each province/island-size combination (jk)

$$R1_{jk} = \frac{\sum_{t''} P_{jkt''} + \sum_{t'} \hat{P}_{jkt'}}{\sum_{t'} \hat{P}_{jkt'}}$$

$$R2_{jk} = \frac{\sum_{t''} A_{jkt''} + \sum_{t'} \hat{A}_{jkt'}}{\sum_{t'} \hat{A}_{jkt'}}$$

where t'' are the empty strata of the jk combination, and t' are the non-empty strata.

The final estimate of a variable X for the province-size combination will be:

$$\hat{X}_{jk} = R1_{jk} * \sum_{t'} \hat{X}_{jkt'}$$

for $X = V ; N ; N' ; T ;$

or

$$\hat{X}_{jk} = R2_{jk} * \sum_{t'} \hat{X}_{jkt'}$$

for $X = B ;$

The estimation of the variables “number of establishments,” “number of places,” and “number of apartments in open establishments” for the reference month will be based on the directory data.

If, for a given province-size combination, all jkt strata are empty, the coefficients are calculated as follows (we denote $(kt)'$ as non-empty strata and $(kt)''$ as empty strata within province j):

$$R1_j = \frac{\sum_{(kt)''} P_{j(kt)''} + \sum_{(kt)'} \hat{P}_{j(kt)'}}{\sum_{(kt)'} \hat{P}_{j(kt)'}}$$

$$R2_j = \frac{\sum_{(kt)''} A_{j(kt)''} + \sum_{(kt)'} \hat{A}_{j(kt)'}}{\sum_{(kt)'} \hat{A}_{j(kt)'}}$$

With

$$\hat{X}_j = R1_j * \sum_{(kt)'} \hat{X}_{j(kt)'}$$

$$\hat{X}_j = R2_j * \sum_{(kt)'} \hat{X}_{j(kt)'}$$